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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/590,276

08/22/2006

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050099-0354

7378

20277 7590 05/19/2009
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EXAMINER

PAREKH, NITIN

ART UNIT

PAPER NUMBER

2811

MAIL DATE

DELIVERY MODE

05/19/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/590,276	Applicant(s) KANZAKI ET AL.	
	Examiner Nitin Parekh	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 5-7 and 12-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 8-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8-22-06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

1. Applicant's election of the device claims 1-11 (Embodiment I) without traverse is acknowledged.
2. Claims 5-7 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:
 - A. Claims 5; and 6, 7 belong to the Embodiments III and IV respectively (Fig. 15-22 and 23-26 respectively).

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 5-7 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1, 3, 4, 8, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao in view of Chittipeddi et al. (US Pat. 5986343).

Regarding claims 1, 3, 4, 8, 9 and 11, Zhao et al. disclose a semiconductor device (see Fig. 4 and 12) with:

- a bonding pad structure, the bonding pad (410 in Fig. 4) having a first/composite metal formed using a top layer wiring layer (see V3/M4 in Fig. 4; Col. 10, lines 20-25), and
- a plurality of second metal columns (see M3 and 1208 in Fig. 4, 7 and 12 respectively; Col. 10, line 42; Col. 16, lines 14-22) each of which having a variety of shapes/geometries/profiles including conventional rectangular/line shape having a long side (see Col. 19, lines 40-45), is arranged under the first metal and is connected with the first metal concerned (see V3 and M3 in Fig. 4), and
- the second metal columns being embedded in an insulating dielectric layer (D in Fig. 4; Col. 11, line 21) under the first metal, and an upper part is connected mutually in the insulating layer concerned
- a first lower-layer wiring layer of one layer (see V2 in Fig. 4; Col. 12, line 54) under the top layer wiring layer, wherein the bonding pad further has a third metal (Col. 14, line 28) which is arranged under the second metal, connected with the second metal concerned
- a plurality of lower-layer wirings (see M1/1208 in Fig. 4/12; Col. 18, lines 55-60) including a second lower-layer wiring layer below the bonding pad; wherein in a

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region of a lower part of the bonding pad, a wiring by the second lower-layer wiring layer is divided into a shapes/geometries/profiles including conventional rectangular/line shape having a plurality of lines, and

- an upper passivation layer/part (see 411 in Fig. 4; Col. 10, line 27) being bonded/connected with the insulating layer

(Fig. 4 and 12; Col. 10, line 6- Col. 11, line 5; Col. 16, line 10- Col. 19, line 60; Col. 4-19).

Zhao et al. fail to teach a plurality of bonding pads being put in order and located to a long-side direction of the second metal.

Chittipeddi et al. teach a conventional bonding pad structure having an arrangement including a plurality of bonding pads (see 103 in Fig. 1 and 2; Col. 4, line 37) being put in an uniform order and located along/parallel to a long-side direction of an underlying/second metal (see 103 and 224 in Fig. 1 and 2; Col. 4, line 44) to provide the desired layout, spacing, reduced stress and improved yield (Col. 4 and 5).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate a plurality of bonding pads being put in order and located to a long-side direction of the second metal as taught by Chittipeddi et al. so that the desired pad/via layout, performance and reliability can be achieved Zhao's device.

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Regarding claim 4, forming the lower-layer wiring do not distinguish over Zhao and Chittipeddi et al., because only the final product/structure is relevant, not a method of forming the wiring layer by “first layer wiring layer”, “first via layer”, “first fuse or trench layer”, etc. Note that a “product by process” claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marrosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

4. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao and Chittipeddi et al. (US Pat. 5986343) as applied to claims 1 and 9 above, and further in view of Langley (US Pat. 5686762).

Regarding claims 2 and 10, Zhao and Chittipeddi et al. teach the entire claimed structure as applied to claims 1 and 9 above wherein a width W and an interval D in a

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bottom of the second metals satisfy relationship a relation: D being less than $2W$ (see M3/1208 in Fig. 4/12), but fail to teach W being less than or equal to D .

Langley teaches a bonding pad structure (see 14 in Fig. 7-10) wherein a shape of an electrode metal/second metal within vias/channels (see the profile of 22 in Fig. 10; also see Fig. 9) has dimension such that dimensions W and D satisfy W being less than or equal to D to provide robust bonding (Col. 3, lines 31-50; Col. 1-3).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate W being less than or equal to D and D being less than $2W$ as taught by Langley so that the bonding strength and reliability can be improved in Chittipeddi et al. and Zhao's device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 571-272-1663. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAN or Public PAG. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have

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questions on access to the Private PAG system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

NP

/Nitin Parekh/

5-19-09

Primary Examiner, Art Unit 2811